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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,379	09/11/2003	David J. Schroeder	100191	6019

29050 7590 05/31/2005

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EXAMINER
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GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/660,379

Applicant(s)

SCHROEDER ET AL.

Examiner

George A. Goudreau

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-98 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-98 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

George A. Goudreau  
GEORGE GOUDREAU  
PRIMARY EXAMINER

5-051

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asano et. al. (6,679,929).

Asano et. al. disclose a process for cmp planarizing a Cu/Ta based barrier layer during the formation of a Cu damascene. They employ a cmp slurry which is at a pH of (3-10), and which is comprised of the following components to conduct the planarization step:

- H<sub>2</sub>O;
- an abrasive (i.e.-silica, etc.);
- an alkaline earth metal salt;

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- an anticorrosive agent (i.e.-benzotriazole, benzimidazole, triazole, imidazole, tolyltriazole, etc.);
- an oxidizer (i.e.-H<sub>2</sub>O<sub>2</sub>, etc.);
- a polishing accelerator (i.e.-citric acid, tartaric acid, oxalic acid, etc.); and
- an aliphatic carboxylic acid; and
- a PH adjusting agent (i.e.-HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, an aliphatic carboxylic acid

This is discussed in columns 1-14. Asano et. al. fail, however, to specifically disclose the following aspects of applicant's claimed invention:

- the specific cmp polishing process parameters, which are claimed by the applicant;
- the specific usage of fumed silica as the abrasive particles; and
- the specific usage of salts of Ca, Ba, or Sr as the salts of the alkaline earth metals

It would have been inherent that the citric acid, tartaric acid, or oxalic acid which are employed in the cmp slurry taught above are capable of functioning as chelating agents for Cu ions in the cmp slurry taught above. The examiner cites the case law listed below of interest to the applicant in this regard.

In re Swinehart (169 U.S.P.Q. 226 (CCPA )) and In re Best (195 U.S.P.Q. 430 (CCPA )) state that when an examiner has reasonable basis for believing that functional characteristics asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be inherent characteristics of the prior art, the examiner possesses the authority to require an applicant to prove that the subject matter shown to be in the prior art does not possess the characteristics relied upon.

Thus, all of applicant's claimed limitations are fully met in this regard.

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It would have been obvious to one skilled in the art to employ salts of Ca, Ba, Sr as the source of the alkaline earth metal salts in the cmp slurry taught above based upon the following. Asano et. al. generically teach the usage of salts of alkaline earth metal in their cmp slurry. Ca, Ba, and Sr are all well known alkaline earth metals.

It would have been obvious to one skilled in the art to employ fumed silica as the source of abrasive particles in the cmp polishing process taught above based upon the following. The usage of fumed silica as a source of silica abrasive particles in a cmp slurry, which is used to cmp polish a substrate is conventional or at least well known in the cmp polishing arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for supplying silica abrasive particles to a cmp slurry to the specific means, which are employed in the cmp slurry, taught above.

It would have been prima facie obvious to employ any of a variety of different cmp polishing process parameters in the cmp polishing process taught above including those which are specifically claimed by the applicant. These are all well-known variables in the cmp polishing art, which are known to effect both the rate and the quality of the cmp polishing process. Further, the selection of particular values for these variables would not necessitate any undue experimentation, which would have been indicative of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific cmp polishing process parameters which are claimed by the applicant based upon *In re Aller* as cited below.


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Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the cmp polishing process.

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
5. Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection.
6. Any inquiry concerning this communication should be directed to examiner

George A. Goudreau at telephone number (571)-272-1434.

  
George A. Goudreau  
Primary Examiner  
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